ABSTRACT OF THE DISCLOSURE

This method permits manufacturing EPDM rocket motor insulation in which carbon fibers are dispersed and immobilized in the EPDM polymeric matrix, but are not excessively fractured or fragmentized, i.e., broken into smaller fragments, when encountering degrees of shear necessary to homogeneously or otherwise distribute or disperse the carbon fibers in the EPDM polymeric matrix. The method is substantially solvent free, and is performed via distributive/reduced shear mixing to distribute the fragile carbon fibers into a rubber matrix without excessive damage. According to one embodiment, at least about 50% of the elastomer composition introduced into the mixing apparatus is liquid EPDM terpolymer having sufficiently low molecular weight and high diene content to permit dispersion of the carbon fibers in the EPDM without substantial fragmentation of the fibers. According to another embodiment, mixing takes place in a kneader capable of rotating a screw having a discontinuous screw-thread about the screw axis while superimposing an axial reciprocating stroke to the screw. The kneader imparts low shear distributive mixing of the carbon fibers in the EPDM terpolymer.